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tures, etc., which result from change. Le Conte gives a general outline of processes under his first heading, *Dynamical Geology*, but reserves much of their amplification to be introduced under *Structural Geology* in explanation of the principal products of change, namely, rocks, rock structures and mountains.

A few subjects are developed by the presentation and discussion of alternative theories, and these serve the important end of illustrating the method of scientific progress. Others are not carried beyond the safe ground of established result, and yet others are confessedly treated from the personal standpoint of the author, who supports his views by argument. For the professional and critical reader the passages last mentioned are doubtless the least convincing and satisfactory of the treatise, but they strengthen it in another way by exhibiting the author in his proper character as an able investigator and original thinker. Moreover, the literary style, which, albeit, is ever lucid and direct, often assumes the characteristics of a spoken address, so that the reader is distinctly conscious of the writer's individuality.

Only five years have elapsed since the last revision of the book, and the amount of change now introduced is not large, though enough to require a complete resetting of type. Perhaps it is best expressed by saying that in a total of one thousand figures sixty are new. Among the subjects amplified are earthquakes, igneous rocks, geologic climates, trilobites and Mesozoic and Cenozoic vertebrates. The Cambrian is given higher taxonomic rank than before, but the Algonkian is not recognized.

It is, of course, easy to pick flaws, for the broadest investigator and most scholarly student is not omniscient. Our author tells us that tideless waters are essential to the production of deltas, and the flux and reflux of tides to the creation of estuaries. Even Chesapeake Bay and the fiords of Norway are ascribed to tidal action, and the function of submergence in the origination of estuaries is almost ignored. Not only is the old view retained, that gneiss is a stage in the making of granite, and that the Archean consists essentially of metamorphosed sediments; but no mention even is made of the view prevalent among modern investiga-

tors, that gneiss is usually altered granite, and that the Archean complex consists largely of altered igneous rocks. The student of mountain dynamics could wish that the author's hypothetic explanation of the Basin ranges were stated with less confidence; the physiographer that crude sketches by early explorers of the Grand Canyon of the Colorado and the Mauvaises Terres were replaced by more realistic drawings; and the biologist that a more modern classification of living forms were employed.

But these and other blemishes may freely be forgiven to a book that sets forth the broad generalizations and fundamental principles of its particular science in orderly and attractive form, and at the same time illustrates and embodies the true and essential spirit of all science.

G. K. GILBERT.

The History of Mankind. By PROF. FRIEDRICH RATZEL. Translated from the second German edition by A. J. Butler, M. A. With introduction by E. B. Tylor, D. C. L., with colored plates, maps and illustrations. Vol. I. pp. 468. London and New York, Macmillan & Co. 1896. Price, \$4.00.

Prof. Ratzel, of Leipzig, has achieved a well-earned reputation as a writer and teacher of geography in its relation to man and human culture. His chief work, '*Völkerkunde*,' appeared in 1885, and some years later a second edition was called for, of which the above is a translation. It is a book intended for the general public rather than the scientific student, and in that respect will prove less satisfactory to the latter than, for instance, Prof. Waitz's '*Anthropologie*''. Ratzel does not give references to authorities for his statements, thus avoiding notes and the discussion of small points, but leaving his reader without an aid to further researches. His style is clear and pleasant, and the translator has, as a rule, done his part of the task cleverly, and given an easy English rendering to the original. The illustrations are abundant, accurate and well printed, and aid materially in bringing the descriptions home to the mind.

This first volume includes two 'Books,' one on the principles of Ethnography and the second on 'The American-Pacific Group of

Races,' that is, the Polynesians, Australians and Malays.

It may be appropriate here to ask why the translator renders 'Völkerkunde' in the title of Book I. by 'Ethnography,' while the work itself he christens 'The History of Mankind,' which it is not in any sense of the phrase, nor is it so called in the original.

The author sets for himself the task of describing mankind 'as we find it to-day throughout the earth;' that is, he confines himself to the ethnography of the present age, and does not deal in history or archaeology. His remoter aim is 'to demonstrate the cohesion of the human race.' In this particular field he belongs to the historic school, and where he finds similarities, *e. g.*, in religions of American, African and Australasian tribes, which he cannot explain, he 'predicts' (p. 40) that they 'will be found germs of survivals of Indian or Egyptian tradition.' This antique explanation (why did he not say Hebrew tradition?) will no longer avail in the light of modern psychologic science applied to ethnography.

In his detailed descriptions the author has been careful to present an accurate perspective of the life of the ruder races. He aims to give them their just position in the scheme of the world, and safely steers between the rocks of indiscriminate praise and under-valuation. He is constantly on the alert to point out the connection between special forms of culture and the natural conditions which give it color and form. His work is one which will be hailed with pleasure by all interested in the diffusion of knowledge regarding man, and it may be recommended as much the best in the domain which it treats now accessible in English.

D. G. BRINTON.

UNIVERSITY OF PENNSYLVANIA.

SOCIETIES AND ACADEMIES.

NEW YORK ACADEMY OF SCIENCES, OCTOBER
5, 1896.

At the meeting of the Academy, October 5, 1896, the following gentlemen were nominated as honorary members of the Academy, and on ballot were duly elected: Prof. James J. Thomson, Cavendish professor of physics in the University of Cambridge, England; Prof. Felix

Klein, professor of mathematics in the University of Göttingen, Germany; Prof. Henri Moissan, of the University of Paris, France.

On the organization of the Section of Astronomy and Physics, Prof. J. K. Rees stated that the work of the Columbia College observatory upon the variation of latitude had been continued during the past summer in such a manner that forty pairs of stars were observed every two weeks. This is a part of the general programme to continue these observations for the next two or three years until the observatories contemplated by the National Geodetic Association should be established. Prof. Rees also referred to the work of Dr. Davis, of the Astronomical Department of Columbia, who is about to undertake the reduction of the Piazzi catalogue devoting himself especially to the reduction of declinations.

Dr. H. Jacoby reported on the proceedings of the meeting held at Paris to consider the astro-photographic star charts. He stated that the 36,000 plates to be used in the catalogue of stars down to the 11th magnitude have nearly all been made, and the work measuring these plates is well under way. The Postdam measurements are practically ready for publication. The Paris and Greenwich reports will be ready in from five to seven years. The limit of accuracy in all of this work is about 0''.2 of arc. This catalogue is expected to contain about 2,000,000 stars.

Wm. HALLOCK,
Secretary of Section.

ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA, SEPTEMBER 29, 1896.

DR. S. G. DIXON communicated an experiment that tends to establish the spore formation in the Tubercl bacillus. A glass tube was made six inches in length, one-half inch in diameter, having two bulbous enlargements situated one and one-half inches apart. *Agar Agar* nidus was placed in these hanging enlargements and the tube plugged at either end with cotton. After thorough sterilization the tube was placed in the Dixon manipulating chamber, when the cotton was removed from one end and the *Agar Agar* in one of the culture mediums inoculated with a growth of the tubercle bacillus. Then the tube was carefully replugged and